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ABSTRACT

The performance of 20 experienced elementary and secondary school teachers was measured and compared with similar data collected about 336 student teachers at the University of Toledo (Ohio). The two observation inventories used were the Classroom Observations Keyed for Effectiveness Research (COKER) and the Teacher Performance Assessment Instruments (TPAI). Scores were obtained on 49 competencies identified as important in teacher education and teaching. Preliminary analysis indicated different results from the two observation instruments, which provides insight into differences between the two instruments. Other results included: (1) Student teachers had higher means on those competencies involving behaviors required of them; (2) Student teachers tended to score higher on competencies that can be "technically" demonstrated; and (3) Experienced teachers scored higher on competencies involving behaviors that come with time and experience. (CJB)

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A COMPARISON OF TEACHING PERFORMANCE AS MEASURED THROUGH OBSERVATION OF STUDENT TEACHERS AND EXPERIENCED TEACHERS[1]

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Introduction

The measurement of teacher performance has become an important, contemporary issue for the teaching profession. Several states have passed legislation requiring some type of performance assessment for teacher certification. Out of the recent concerns about deficiencies in education have come implications that the present "Crisis in Education" is due in part to inadequate teacher performance. Research in this area is to some extent in its infancy, in part due to measurement problems.

Over the past couple of decades there have been numerous approaches to measuring teacher performance through observation, ranging from frequency tabulations in matrices to recording anecdotal information in a subjective manner. Numerous observation inventories have gone through development and revision. To some extent, the measurement has been polarized into two approaches, low-inference observation and high-inference observation depending upon the extent of inference about the quality of the performance required by the observer. The case can be made for strengths and weaknesses associated with either approach.

Teacher performance tends to be susceptible to measurement problems. Shavelson and Dempsey-Atwood (1976) found that there is considerable instability over time associated with some teacher behaviors. Attempts to relate pupil achievement to teacher behavior have produced less than conclusive results. Such relationships would be difficult to establish for

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student teachers and their pupils, due to the limited time that student teachers are in a single classroom, and due to the overriding influence of the cooperating teacher and other factors beyond the control of the student teacher.

The competency-based, teacher education (CBTE) movement generated a variety of definitions of teacher competencies, performance and behavior. It may be difficult to obtain an adequate balance between having too many, specific teacher behaviors, and having too few, general behaviors. This relates to the key question, "If a program is competency-based, what competencies are intended to be developed by the program?" If the competencies are known, how will prospective teachers be measured to determine whether or not they are competent? The content of this paper deals with these questions and with the results from a systematic program of observation.

The Measurement of Performance

Based on a content analysis of the instructional modules of the competency-based teacher education program at The University of Toledo, 49 competencies were identified as underlying the program. After considerable review and exploratory work, it was decided to use two established, observation inventories; (1) the Classroom Observations Keyed for Effectiveness Research (COKER), as a low inference inventory, and (2) the Teacher Performance Assessment Instruments (TPAI), as the high-inference inventory. These inventories are considerably different in their approaches to measuring teacher performance.

The COKER consists of a matrix of 389 cells in two sections. Section A is two-dimensional, representing the interaction between teacher and pupils. The cells of the matrix represent behaviors and data are recorded only in

terms of whether or not a behavior occurs during the observation period. Section B contains 33 categories of pupil behavior and 86 categories of teacher behavior. These contain both positive behaviors which serve to promote learning and negative behaviors which tend to disrupt learning. Again, categories are simply checked if the behaviors occured. With the COKER only behavior in the instructional setting is recorded; any supportive activities such as planning that occur outside the classroom are not included.

The TPAI consists of 51 behavioral statements classified into four groupings call instruments. These four instruments are: (1) Teaching Plans and Materials, (2) Classroom Procedures (CP), Interpersonal skills (IS) and Professional Standards (PS). There is also a fifth instrument called Student Perceptions (SP), which is not an observation inventory, but a student perception scale. The 51 behaviors are called "indicators," and each indicator has a set of "descriptors" which enable an observer to provide a score from 1 to 5 on the indicator. The TPAI involves behaviors demonstrated in the classroom and supportive behaviors that may occur outside the classroom.

In order to obtain scores for the 49 competencies identified for the program, it was necessary to map the behaviors from the COKER and TPAI onto the competencies. That is, one or more (usually many more) cells of the COKER or indicators of the TPAI define a competency in an operational sense. The mapping of behaviors onto competencies was an extensive process, requiring revision and successive approximations. Once the behaviors for a competency are established in terms of the content of an observation inventory a score can be obtained. Of the 49 University of Toledo competencies, the TPAI measures 45 and the COKER 22.

The scoring of TPAI data is quite straightforward; a scaled score, on a scale of 1 to 5 is obtained. The observer provides a score of 1 to 5 for each indicator. The scores for the indicators of the competency are summed and a mean computed to adjust for the varying numbers of indicators across competencies.

Scoring for the COKER is more complex since the original data do not contain a scale, only marks in cells indicating that the behavior has occurred. There are a couple of approaches to scoring COKER data, and the one used presently at the University of Toledo is called the "proportionality score." A value is provided for each item or cell that maps onto a competency, which is the proportion of times (p) the item was checked over how many times the teachers were observed. These proportions are then summed, and this sum divided by the number of items in the competency. Scores so generated can take on values from 0 to 1.0 inclusive. These are multiplied by 100 simply to provide a more familiar scale.

Items of the COKER are scored in one of two directions; the presence or absence of behavior. For items scored on absence of behavior, 1-p rather than p is the value initially obtained. By doing this, the intent of the competency score is consistent across items.

An observation with the TPAI lasts approximately 50 minutes, the length of a typical class period. Student teachers were observed two times per quarter with the TPAI. COKER observations are five minutes in length for Section A, followed by the completion of Section B from memory. At any one visit two complete observations are made, and a student teacher is visited four times during an academic quarter.

Numerous reliability studies have been done with both the COKER and the TPAI. Results are reported in various papers and monographs and will

not be repeated here. Reliability checks and reader-agreement checks are conducted periodically among the observers at The University of Toledo.

Groups Measured

The focus of this paper is on a comparison of the performances of student teachers and experienced teachers. Performance is defined as scores on the 49 competencies mentioned earlier. The student teachers, of which there were 336, were enrolled in The University of Toledo program and did their student teaching during the period 1979-81. Student teachers included those preparing for elementary school, secondary school and special education.

During the Spring of 1983, twenty experienced teachers located in Toledo area schools agreed to participate in the observation. They were observed the same number of times as the student teachers. Eleven of the experienced teachers were in elementary schools and nine in secondary schools.

Results

The means were determined for each competency for the two groups and t-tests for the difference between two means computed. Although the two groups were not random samples from some larger populations, an argument could be made that they are representative of larger populations. Student teachers at The University of Toledo are quite similar across the years. The 20 experienced teachers were secure and able teachers. At least the use of inferential statistics involves a comparison based on an estimate of internal inherent variance.

The mean and the t-values of the statistical tests are given in Table 1 and Table 2; Table 1 containing those for the 45 competencies measured by the TPAI, and Table 2 those for the 22 competencies measured

by the COKER. A two-tailed test was used and alpha set at .05. The differences between the means were tested using $\bar{X}_1 - \bar{X}_2$, thus a positive t-value indicates that the student teachers had the greater mean.

Since the numbers of student teachers were large, the t-tests had a great deal of statistical power, and correspondingly, many of the t-values were statistically significant. For the TPAI, 29 differences in means were statistically significant, nine favoring the student teachers and 20 the experienced teachers. The COKER results showed 11 statistically significant differences, but for seven the student teachers had the higher mean and for only four did the experienced teachers have the higher mean.

The statistically significant differences on competencies measured by the TPAI did group in certain topics. The majority of differences favoring the student teachers were found in the first topic: Planning, Teaching Materials/ Equipment and Evaluation. Experienced teachers had the most number of statistically significant differences in their favor on competencies dealing with Communication with Learners, and Professional Standards; the concluding two topics. The pattern of statistically significant differences for the COKER was different. Not only did the student teachers have the greater means on most of those competencies that showed a statistically significant difference, but those differences were spread more across the topics.

As an exploratory analysis, 48 secondary student teachers were identified in terms of their subject taught while student teaching. The subjects were: (1) basic subjects, (2) social studies, (3) health and physical education, (4) natural science and mathematics, and (5) business. The means of these groups were determined for the 22 competencies measured by the COKER. The intent of this analysis was to see whether or not varying performance on the competencies seemed to be associated with the subject

taught. It is possible that the extent to which competencies are demonstrated is a function of the subject being taught. The means for the five groups are given in Table 3.

The groups had considerable differences in means on competencies dealing with Instructional Strategies, Techniques and Methods (C-16 through C-24). Business tended to be low in varying or modifying strategies and methods. Student teachers in basic subjects and natural science-mathematics tended to position highest on most of these competencies, although on several competencies health and physical education scored quite high. The social studies student teachers did not score highest on any competency, and their placements among the five groups varied considerably.

The competencies involving Communication with Learners, C-31 through C-38, had highly similar means across the groups. With the exception of C-35, for which business had a relatively low mean, differences among means were modest.

The final five competencies concern Learner Reinforcement-Involvement. The means on the first two competencies were highly consistent, a pattern not maintained for the final three competencies. On C-42 and C-43 the student teachers teaching basic subjects were high and those in social studies low. The health and physical education student teachers were high on the final competency, C-44, business low with a mean of zero, and social studies too was low. Overall, there was considerable difference among the means across the subjects taught.

Conclusions

With the number of competencies measured and the extent of the data base, a large number of specific conclusions can be drawn. For the purposes of this paper, a limited number of general conclusions are presented below.

Those readers interested may refer to Dickson and Wiersma (1984) for more detail about the measurement process, the results and the conclusions.

The major conclusions based on the results reported herein are:

1. The student teachers had higher means on those competencies involving behaviors required of them. For example, the planning and identification of evaluation procedures are essential parts of the required lesson plans. The experienced teachers are not required to do the planning to the extent suggested in the instructional modules of the teacher education program at The University of Toledo. Correspondingly, experienced teachers omit some of these behaviors. This raises the question, "Are we requiring student teachers to do things few experienced teachers do?" Even if we have such requirements they may be valuable, but at least their possible value should be considered.

2. In the classroom, when student teachers scored higher they tended to do so on competencies that can be "technically" demonstrated, such as providing assignments and learning opportunities for different ability levels.

3. Competencies on which the experienced teachers scored higher appear to involve behaviors which come with time and experience, competencies for which behaviors may be more subtle. Competencies in the topic of Communication with Learners are examples.

4. When considering the competencies measured by both instruments there is some inconsistency in the patterns of significant differences. Of the 18 competencies measured by both inventories, 10 competencies had a significant difference on one, but not the other inventory, and three competencies had no significant differences on either inventory. For the five competencies that had significant differences on both inventories, three had the same group high and two had the groups reversed. These results indicate that measurement in this area is highly instrument dependent.

5. The differences in the means for student teachers in various subjects indicated that performance on competencies is related to the subject taught. This result has important implications because it argues against the "generic competencies" idea, of competencies being equally applicable across all areas of teaching. At least, there appear to be noteworthy differences as the secondary level. It may be that teaching at the elementary level has its set of generic competencies, but they would not be equally applicable across secondary subjects.

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Table 1

Means for Student Teachers ($\bar{X}_1$) and Experienced Teachers ($\bar{X}_2$) for 45 Competencies Measured by the TPAI

	Competency	$\bar{X}_1$	$\bar{X}_2$	t-value
1.	Plans units of instruction.	3.53	2.39	4.39
2.	Plans instruction at a variety of cognitive levels.	3.62	3.00	2.07
3.	Can state pupil outcomes and/or student course objectives in behavioral terms (behavioral objectives).	3.68	2.10	4.79
4.	Has realistic expectations for the learning process and student readiness for learning.	3.03	2.33	2.41
5.	Gathers, organizes, and evaluates pertinent information about students for effective instruction.	2.78	2.77	.04
6.	Identifies and evaluates learning problems of students in content area being taught.	2.73	2.84	-.48
7.	Keeps informed of current professional/professional subject area literature and curricular learning materials/resources available.	3.38	4.20	-4.32
8.	Knows how to select (or construct), organize and use appropriate instructional materials and equipment to facilitate learning activities.	3.03	2.48	2.50
9.	Uses criteria and effective procedures for determining pupil achievement of learning objectives.	3.51	3.05	1.77
10.	Selects/develops appropriate assessment techniques and instruments for instructional activities.	3.36	2.43	3.88
11.	Collects, quantifies, and interprets data from appropriate assessment instruments.	3.24	2.90	1.36
12.	Maintains evaluation records.	2.96	3.03	-.28
13.	Engages in professional development by obtaining and analyzing evaluative information concerning the effectiveness of instruction.	2.50	2.79	-1.95
14.	Uses information about the effectiveness of instruction to revise it, with possible curriculum modifications.	3.48	3.90	-1.23
15.	Relates to accountability issues concerning responsibilities to students, parents, and the instructional process.	3.16	3.52	-1.50

Table 1 (Cont.)

Competency	$\bar{X}_1$	$\bar{X}_2$	t-value
16. Uses a variety of instructional strategies.	2.94	2.77	1.31
19. Establishes transitions and sequences in instruction which are varied.	3.71	3.74	-.23
20. Modifies instructional activities to accommodate identified learner needs.	2.29	2.00	2.90
21. Demonstrates ability to work with individuals, small groups and large groups.	3.45	3.61	-1.60
22. Structures the use of time to facilitate student learning.	4.02	4.26	-1.50
23. Uses a variety of resources and materials.	3.03	2.48	2.39
24. Provides learning experiences which enable students to transfer principles and generalizations to situations outside of school.	3.44	3.55	-.67
25. Provides assignments/learning opportunities interesting and appropriate to different ability levels of pupils.	2.33	1.85	2.82
26. Demonstrates knowledge in the subject areas.	3.58	3.98	-2.00
27. Demonstrates self-direction and conveys the impression of knowing what to do and how to do it.	3.93	4.29	-2.57
28. Works effectively as a member of an instruction team.	3.63	4.53	-6.43
29. Uses acceptable written and oral expression with learners.	4.37	4.80	-2.69
30. Adjusts components of the physical/learning environment over which the teacher has control to facilitate learning.	4.02	4.31	-2.23
31. Provides group communication (cooperation, interaction, learning from others).	3.80	3.78	.12
32. Uses a variety of functional verbal and nonverbal communication skills with students.	3.89	4.39	-5.00
33. Gives clear directions and explanations.	3.67	4.18	-3.64
34. Motivates students to ask questions.	3.78	4.18	-2.66
36. Accents varied student viewpoints and/or asks students to extend or elaborate answers or ideas.	3.94	4.43	-3.27
38. Provides feedback to learners on their cognitive performance	2.84	2.94	-.83

Table 1 (Cont.)

	Competency	$\bar{X}_1$	$\bar{X}_2$	t-value
39.	Expresses a positive personal attitude toward the teaching profession.	3.85	4.48	-3.15
40.	Maintains an environment in which students are actively involved, working on-task.	3.94	4.39	-4.09
41.	Implements an effective classroom management system for positive student behavior (discipline).	3.66	4.15	-4.90
42.	Uses positive reinforcement patterns with students.	4.02	4.51	-4.08
43.	Assists students in discovering and correcting errors and inaccuracies.	3.23	3.54	-3.44
44.	Develops student feedback, evaluation skills and student self-evaluation.	2.36	2.39	-.27
45.	Accepts responsibility, is dependable.	2.79	3.14	-3.18
46.	Evidences cooperation with others (teachers, administrators, support staff, parents, etc.) in planning and teaching.	2.87	3.73	-7.68
47.	Acts as an appropriate model in terms of ethics, attitudes and values.	4.54	4.90	-4.50
48.	Attends teacher and other professional meetings.	3.51	4.40	-5.24
49.	Understands and follows school law, policies, and procedures and their effects on teachers, and teaching, including professional conduct standards.	4.21	4.95	-12.33

Table 2

Means for Student Teachers ($\bar{X}_1$) and Experienced Teachers ($\bar{X}_2$) for 22 Competencies Measured by the COKER

	Competency	$\bar{X}_1$	$\bar{X}_2$	t-value
16.	Uses a variety of instructional strategies.	30.70	26.95	1.96
17.	Uses convergent and divergent inquiry strategies.	9.62	8.10	1.86
18.	Develops and demonstrate problem solving skills.	16.94	16.71	.24
19.	Establishes transitions and sequences in instruction which are varied.	33.40	31.03	5.78
20.	Modifies instructional activities to accommodate identified learner needs.	19.47	12.52	2.35
21.	Demonstrates ability to work with individuals, small groups and large groups.	7.24	3.68	3.46
22.	Structures the use of time to facilitate student learning.	98.39	98.94	-1.96
23.	Uses a variety of resources and materials.	30.07	20.94	1.46
24.	Provides learning experiences which enable students to transfer principles and generalizations to situations outside of school.	5.93	5.64	.38
31.	Provides group communication (cooperation, interaction, learning from others).	43.93	40.21	3.68
32.	Uses a variety of functional verbal and nonverbal communication skills with students.	50.88	56.11	-8.30
33.	Gives clear directions and explanations.	60.71	61.34	-.84
34.	Motivates students to ask questions.	26.16	24.59	1.65
35.	Uses questions that lead students to analyze, synthesize and think critically.	31.29	34.51	-2.28
36.	Accepts varied student viewpoints and/or asks students to extend or elaborate answers or ideas.	4.09	3.79	.43
37.	Demonstrates proper listening skills.	56.96	56.70	.93
38.	Provides feedback to learners on their cognitive performance.	6.52	5.46	1.43
40.	Maintains an environment in which students are actively involved, working on-task.	74.61	75.75	-4.38

TABLE 2 (Cont'd)

	Competency	$\bar{X}_1$	$\bar{X}_2$	t-value
41.	Implements an effective classroom management system for positive student behavior (discipline).	60.09	58.93	3.51
42.	Uses positive reinforcement patterns with students.	6.39	2.78	5.71
43.	Assists students in discovering and correcting errors and inaccuracies.	23.39	21.47	1.56
44.	Develops student feedback, evaluation skills and student self-evaluation.	8.16	7.63	.15

Table 3

Mean Scores on Competencies Measured by the COKER - Secondary Subjects

Comp. No. / n	Basic Subjects 8	Social Studies 10	Health & PE 10	Nat. Sc. & Math 13	Business 7
16	36.5	28.2	25.4	34.9	28.5
17	11.0	7.4	7.0	11.9	7.4
18	18.7	12.5	14.7	16.6	8.8
19	34.1	31.7	32.4	34.1	30.7
20	24.1	16.6	28.4	17.7	9.3
21	10.0	3.2	8.7	6.6	6.3
22	97.6	99.3	99.2	98.1	99.6
23	29.6	37.0	41.3	49.8	25.6
24	7.6	3.4	2.3	7.5	2.8
31	51.4	42.3	53.6	40.0	44.0
32	51.4	52.2	51.1	50.9	54.1
33	61.3	59.6	63.9	60.5	62.6
34	27.2	24.1	25.4	26.1	22.4
35	29.1	28.2	30.1	35.8	22.8
36	5.0	2.9	2.2	4.5	2.2
37	58.2	55.9	58.1	56.7	57.5
38	8.5	4.2	2.7	7.6	6.7
40	74.9	74.8	76.1	74.7	75.7
41	61.0	59.8	60.8	59.9	61.0
42	7.9	1.4	6.2	4.2	2.7
43	25.4	18.5	20.5	24.4	22.5
44	9.4	1.1	11.8	5.8	0.0

ABSTRACT

Competency Assessment Using High and Low Inference Observation Instruments with Student Teachers and Experienced Teachers

The performance of 20 experienced teachers (Elem. & Sec.) was measured using high and low inference observation inventories and compared with similar data from student teachers. Scores were obtained on 49 competencies identified as important in teacher education and teaching.

Statistics include means and standard deviations for both teaching groups and use of t-tests for computing differences between means. Preliminary analyses indicate different results from two observation systems which provides more insight into what is different between them, the successful application of such measurement to inservice teachers and the considerable ability of student teachers in The University of Toledo CBTE program.